Playing Well With Others

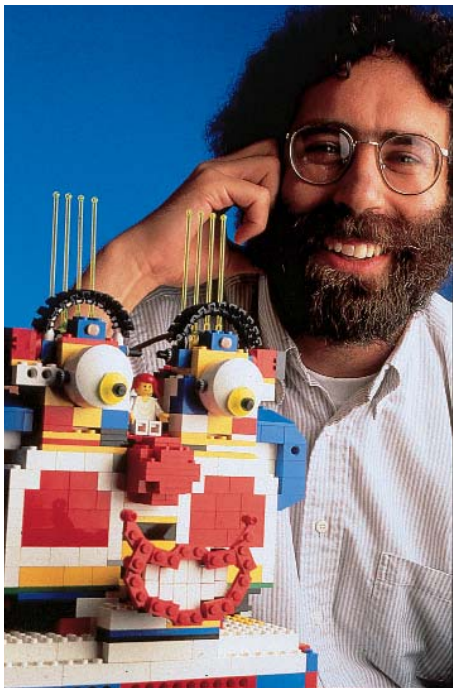
Media Lab's Mitchel Resnick Shares His Toys

A visit with Mitchel Resnick in MIT's Media Lab is a lot like a play date. A professor in the Epistemology and Learning Group, Resnick is building teched-up toys to help kids learn in radically inventive ways. In one project, he melds tiny computers, gears, motors, and sensors with traditional Lego bricks to create what he calls "the construction kit for the digital age."

Lego's February announcement that the company will market Mindstorms (a $200 digital product based on Media Lab designs) later this year met with considerable fanfare. But Resnick is already pushing ahead with the next generation of intelligent Legos. His group is developing smaller, lighter, and—parents will be relieved to hear—cheaper versions endowed with more capabilities than the Mindstorms. A child can easily program the devices to create communicating creatures, build Rube Goldberg machines, even invent their own scientific instruments.

At the Computer Clubhouse in Boston (a learning center for disadvantaged youths that he helped found), Resnick moves easily from troubleshooting a sticky Lego gear with a fifth-grade girl to discussing the finer points of computer graphics with a budding 18-year-old artist. It's no surprise that the kids respond to Resnick. An animated talker with an almost incessant grin, he seems to understand how they think and wants to give them the tools to design, create, construct, and learn.

Resnick treated *TR* Associate Editor Rebecca Zacks to a game of show-and-tell, demonstrating a couple of his computerized critters.



WEBB CHAPPELL

Man-machine interface: Resnick and Legos.

Resnick sits in his sunny office, *a plethora of playthings spilling from between his books, papers, and computer equipment. He claims he can only talk when he has an object to fidget with, so he pulls out a new pen from a pack of 12 and begins:*

Children grow up living in the physical world. They have all types of intuitions, experiences, passions about physical objects. And there are all sorts of great things that kids learn through a manipulation of physical objects, but there are certain things that are difficult to learn.

If we give kids new types of digital building blocks, they can learn not only about number, shape, scale, but they can learn about interaction, communication, dynamics, in the same way that they traditionally learn through direct manipulation.

From a cardboard box on a shelf behind him, Resnick pulls out a pair of small Lego constructions, each equipped with four wheels and infrared sensors. He points to the miniature computers, perhaps an inch across, carried in the belly of each toy.

This is what we call a cricket; it's a type of programmable brick. This is extending the metaphor of the Lego brick and saying: What if we had a Lego brick but we put computation inside? And where traditional Lego bricks are good for building structures, these crickets are good for building behaviors. In the past, kids would build castles and houses. Now kids can build things and make them come to life.

Resnick places the toys on the floor facing away from each other.

Here's an example where we have two of these little creatures made out of crickets; these already have little programs that kids loaded into them. And at first it might look like they're not doing very much, but in fact they're both sending out signals—they communicate by infrared.

He turns the creatures around to face one another, and they begin to shimmy on their wheels.

Now if they see each other, they're so happy they go into a little dance. An important point is that we do not intend to give these as ready-made toys to kids. Because it's not when they're playing with these that we think the richest learning goes on, but in creating them, creating the structures, the mechanisms, and the behaviors. And the behaviors create the communication.

When the kids do things like this, they have to start thinking. If they want the white one to tell the red one to dance, they might first start by having the white one send the red one a signal saying "dance." But the red one might not know what "dance" means, so it won't work. Then they'll either have to teach the red one what "dance" means or have the white one communicate in the language the red one understands: It might say, "move your left wheel a little bit, move your right wheel a little bit."

As he talks, Resnick continues to demonstrate the toys' behaviors—he places his hands between them to break communication, then allows them to "see" one another again and they resume their dance.

Buried in there, there's a deep idea about communication. When I talk to you, I need a model of what you already understand. So all good communicators have a model of the listener. And as kids are designing new communicating things, they have to deal with that in a very direct way. So by building up a world of communicating things, it provides them with a framework for talking about all sorts of communication, including their own communication.